

# Natural Language Processing Nanodegree Syllabus

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## Contact Info

While going through the program, if you have questions about anything, you can reach us at [support@udacity.com](mailto:support@udacity.com). For help from Udacity Mentors and your peers visit the Udacity Classroom.

## Nanodegree Program Info

Learn cutting-edge natural language processing techniques to process speech and analyze text. Build probabilistic and deep learning models, such as hidden Markov models and recurrent neural networks, to teach the computer to do tasks such as speech recognition, machine translation, and more!

### Prerequisite Skills

A well-prepared learner is able to:

- This program requires experience with Python, statistics, machine learning, and deep learning.
- You need to have intermediate to advanced Python experience. You are familiar with object-oriented programming. You can write nested for loops and can read and understand code written by others.
- Intermediate statistics background and familiarity with probability.
- Intermediate knowledge of machine learning techniques. You can describe backpropagation, and have seen a few examples of neural network architecture (preferably a recurrent neural network or a long short-term memory network).
- You have seen or worked with a deep learning framework like TensorFlow, Keras, or PyTorch before.

### Required Software

- Python 3.6
- Jupyter notebook 6.0.1 or latest
- TensorFlow
- AWS (optional) Regular acct. with CC
- Alexa Developer Optional
- node.js
- Code Editor
- Python Libraries

**Version:** 3.0.0

**Length of Program:** 75 Days\*

*\* This is a self-paced program and the length is an estimation of total hours the average student may take to complete all required coursework, including lecture and project time. Actual hours may vary.*

## Part 1: Introduction to Natural Language Processing

This section provides an overview of the program and introduces the fundamentals of Natural Language Processing through symbolic manipulation, including text cleaning, normalization, and tokenization. You'll then build a part of speech tagger using hidden Markov models.

### Project: Part of Speech Tagging

In this project, you'll build a hidden Markov model for part of speech tagging with a universal tagset.

#### Supporting Lessons

Lesson	Summary
Welcome to Natural Language Processing	Welcome to the Natural Language Processing Nanodegree program!
Mentor Help, Peer Chat, and Careers	You are starting a challenging but rewarding journey! Take 5 minutes to read how to get help with projects and content.
Get Help with Your Account	What to do if you have questions about your account or general questions about the program.
Intro to NLP	Arpan will give you an overview of how to build a Natural Language Processing pipeline.
Text Processing	Learn to prepare text obtained from different sources for further processing, by cleaning, normalizing and splitting it into individual words or tokens.
Spam Classifier with Naive Bayes	In this section, you'll learn how to build a spam e-mail classifier using the naive Bayes algorithm.
Part of Speech Tagging with HMMs	Luis will give you an overview of several part-of-speech tagging, including a deeper dive on hidden Markov models.

### Project: Optimize Your GitHub Profile

Other professionals are collaborating on GitHub and growing their network. Submit your profile to ensure your profile is on par with leaders in your field.

#### Supporting Lessons

Lesson	Summary
<b>Nanodegree Career Services</b>	The Careers team at Udacity is here to help you move forward in your career - whether it's finding a new job, exploring a new career path, or applying new skills to your current job.
<b>Jobs in NLP</b>	Learn about common jobs in natural language processing, and get tips on how to stay active in the community.

## Part 2: Computing with Natural Language

### Project: Project: Machine Translation

Apply the skills you've learnt in Natural Language Processing to the challenging and extremely rewarding task of Machine Translation. \_Bonne chance!\_

### Supporting Lessons

Lesson	Summary
<b>Feature extraction and embeddings</b>	Transform text using methods like Bag-of-Words, TF-IDF, Word2Vec and GloVE to extract features that you can use in machine learning models.
<b>Topic Modeling</b>	In this section, you'll learn to split a collection of documents into topics using Latent Dirichlet Analysis (LDA). In the lab, you'll be able to apply this model to a dataset of news articles.
<b>Sentiment Analysis</b>	Learn about using several machine learning classifiers, including Recurrent Neural Networks, to predict the sentiment in text. Apply this to a dataset of movie reviews.
<b>Sequence to Sequence</b>	Here you'll learn about a specific architecture of RNNs for generating one sequence from another sequence. These RNNs are useful for chatbots, machine translation, and more!
<b>Deep Learning Attention</b>	Attention is one of the most important recent innovations in deep learning. In this section, you'll learn attention, and you'll go over a basic implementation of it in the lab.
<b>RNN Keras Lab</b>	This section will prepare you for the Machine Translation project. Here you will get hands-on practice with RNNs in Keras.

### Project: Improve Your LinkedIn Profile

Find your next job or connect with industry peers on LinkedIn. Ensure your profile attracts relevant leads that will grow your professional network.

# Part 3: Communicating with Natural Language

## Project: Project: DNN Speech Recognizer

Build a deep neural network that functions as part of an end-to-end automatic speech recognition pipeline.

### Supporting Lessons

Lesson	Summary
<b>Intro to Voice User Interfaces</b>	Get acquainted with the principles and applications of VUI, and get introduced to Alexa skills.
<b>(Optional) Alexa History Skill</b>	Build your own Alexa skill and deploy it!
<b>Speech Recognition</b>	Learn how an ASR pipeline works.



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